

SEQUENCE LISTING

<110> Fraser, Clair
 Galeotti, Cesira
 Grandi, Guido
 Hickey, Erin
 Mesignani, Vega
 Mora, Marirosa
 Peterson, Jeremy
 Pizza, Marigrazia
 Rappuoli, Rino
 Ratti, Giulio
 Scarloto, Vincenzo
 Scarselli, Maria
 Tettelin, Herve
 Venter, Craig

<120> Neisseria Meningitidis Antigens and Compositions

<130> CHIR0334

<140> 09/674,546

<141> 1999-04-30 (International Filing Date)

<160> 3264

<170> PatentIn Ver. 2.1

<210> 1

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<212> DNA

<213> Neisseria gonorrhoeae

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<212> PRT

<213> Neisseria gonorrhoeae

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      20             25             30
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Pro Lys Arg Asp Thr Leu Asn Gly Ser Gly Thr His Thr Leu Pro Val
    35             40             45
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Trp Ala Ile Leu Pro Arg Ser Leu Arg Ser Lys Ser Thr Ile Ile Thr
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 Phe Ser Ala Arg Phe Phe Gly Ser Val Cys Asn Ser Ala Ala Arg Arg
 65 70 75 80
 Ser Ser Cys Pro Ser Pro Lys Ile Gly Ala Val Pro Phe Ile Gly Ser
 85 90 95
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 Lys His Ser Val His Ala Asp Cys Pro Ala Ser Ser Gly Arg Trp Asp
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 Asn Thr Ala
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 <213> Neisseria meningitidis

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 <222> (19)
 <223> Xaa is any amino acid

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 35 40 45

Trp Ala Ile Leu Pro Arg Ser Leu Arg Ser Lys Ser Thr Ile Ile Thr
 50 55 60

Phe Ser Ala Arg Phe Phe Gly Ser Ala Cys Asn Ser Ala Ala Arg Arg
 65 70 75 80

Ser Ser Cys Pro Ser Pro Lys Ile Gly Ala Val Pro Phe Ile Gly Ser
 85 90 95

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Lys His Ser Val His Ala Asp Cys Pro Ser Ala Ser Gly Arg Trp Asp
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Lys Thr Ala
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 <213> Neisseria meningitidis

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 acaatcatca cgttttcggc gcggtttttc gggctctgctt gcaactcggc ggcgcggcgt 240
 tcgtcttgtc cgtcgcccaa aatcggcgcg gtgcctttca tcggttcggg gctgatgggtg 300
 ccgtccgaac cgattttgag gaagagttcg ggcgagaaac acagcgtcca cgcggattgc 360
 ccttgatgcat cgggcagggtg ggacaaaacg gcatag 396

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 <213> Neisseria meningitidis

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 20 25 30

Pro Lys Arg Asp Thr Leu Asn Gly Ser Gly Thr His Thr Val Pro Val
 35 40 45

Trp Ala Ile Leu Pro Arg Ser Leu Arg Ser Lys Ser Thr Ile Ile Thr
 50 55 60

Phe Ser Ala Arg Phe Phe Gly Ser Ala Cys Asn Ser Ala Ala Arg Arg

65		70		75		80
Ser Ser Cys Pro Ser Pro Lys Ile Gly Ala Val Pro Phe Ile Gly Ser						
	85			90		95
Val Leu Met Val Pro Ser Glu Pro Ile Leu Arg Lys Ser Ser Gly Glu						
	100		105		110	
Lys His Ser Val His Ala Asp Cys Pro Cys Ala Ser Gly Arg Trp Asp						
	115		120		125	
Lys Thr Ala						
	130					

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 <212> DNA
 <213> Neisseria gonorrhoeae

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 gatgtcgatg tggcagtagc cggttggggg tttaatcagg tagtcctgat ggtatttcctc 240
 ggcgtcgtag aagtttttca gcggttcgtt ttcaacaacg aggggcagtt ggtattttttg 300
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 <213> Neisseria gonorrhoeae

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 Arg Phe Phe Ile Arg Cys Arg Val Glu Ala Phe Ala Leu Arg Cys Gly
 35 40 45
 Phe Gly Phe Ala Arg Gln Arg Phe Val Gly Phe Ala Asp Val Asp Val
 50 55 60

Ala Val Ala Val Gly Val Phe Asn Gln Val Val Leu Met Val Phe Leu
65 70 75 80

Gly Val Val Glu Val Phe Gln Arg Phe Val Phe Asn Asn Glu Gly Gln
85 90 95

Leu Val Phe Leu Leu Leu Ala Phe Glu Gly Gly Gly Asp Asp Gly Phe
100 105 110

Phe Gly Gly Val Gly Val Val His Ala Ala Ala Val Leu Arg Ala Gly
115 120 125

Val Val Thr Leu Phe Val Glu Ala Gly Arg Ile Asn Asp Ala Glu Ile
130 135 140

Ile Leu Gln Asp Val Val Gln Ala Glu Phe Val Gly Ile Val Gly His
145 150 155 160

Phe Asp Gly Leu Gly Met Thr Arg Met Ala Val Gly His Phe Phe Val
165 170 175

Arg Val Phe Arg Val Ala Val Gly Val Thr Gly Tyr Arg Val Asn His
180 185 190

Ala Val Asp Ala Leu Glu Ile Gly Phe Gln Ala Pro Lys Ala Ala Ala
195 200 205

Gly Glu Val Asn Gly Ala Arg Val His Asp Cys
210 215

<210> 9
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<212> DNA
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gacgcggaag aaatattgca ggatgtcgtc taggctgagt ttgtcggcat cgtagggtcac 480
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<213> Neisseria meningitidis

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Arg Phe Phe Ile Arg Cys Arg Val Glu Ala Phe Ala Leu Arg Gly Gly
35 40 45
Leu Gly Phe Ala Arg Gln Arg Phe Val Ser Xaa Ala Asp Val Asp Val
50 55 60
Ala Val Ala Val Gly Val Phe Asn Gln Val Val Leu Met Val Phe Leu
65 70 75 80
Gly Ile Val Glu Val Phe Gln Arg Leu Val Phe Asn Asn Glu Gly Gln
85 90 95
Leu Val Phe Leu Leu Leu Ala Phe Glu Gly Xaa Gly Asp Asp Gly Phe
100 105 110
Phe Xaa Gly Val Gly Val Val His Ala Ala Ala Val Leu Arg Thr Gly
115 120 125
Val Val Ala Leu Phe Val Glu Ala Gly Arg Ile Asn Asp Ala Glu Glu
130 135 140
Ile Leu Gln Asp Val Val Ala Glu Phe Val Gly Ile Val Gly His Phe
145 150 155 160

Asp Gly Phe Gly Val Ala Arg Met Ala Val Gly His Val Phe Ile Ala
165 170 175

Arg Ile Phe Arg Val Ala Val Gly Val Ala Gly Tyr Arg Val Asn His
180 185 190

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195 200 205

Gly Glu Val Asn Gly Ala Arg Val His Asp Phe
210 215

<210> 11
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<212> DNA
<213> Neisseria meningitidis

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gaagcctttg ccttgccggtg cggctcttgg tttgcccggc agcggttcgt cggcctttgcg 180
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tga 663

<210> 12
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<212> PRT
<213> Neisseria meningitidis

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Arg Phe Phe Ile Arg Cys Arg Val Glu Ala Phe Ala Leu Arg Cys Gly
35 40 45

Leu Gly Phe Ala Arg Gln Arg Phe Val Gly Phe Ala Asp Ile Asp Val
50 55 60

Ala Val Ala Val Gly Val Phe Asn Gln Val Val Leu Met Val Phe Leu
65 70 75 80

Gly Ile Val Glu Val Phe Gln Arg Leu Val Phe Asn Asn Glu Gly Gln
85 90 95

Leu Val Phe Leu Leu Leu Ala Phe Glu Gly Gly Gly Asp Asp Gly Phe
 100 105 110
 Phe Gly Gly Val Gly Val Val His Ala Ala Ala Val Leu Arg Thr Gly
 115 120 125
 Val Val Ala Leu Phe Val Glu Ala Gly Arg Ile Asn Asp Ala Glu Glu
 130 135 140
 Ile Leu Gln Asp Val Val Ala Glu Phe Val Gly Ile Val Gly His Phe
 145 150 155 160
 Asp Gly Phe Gly Val Ala Arg Met Ala Val Gly His Val Phe Ile Ala
 165 170 175
 Arg Ile Phe Arg Val Ala Val Gly Val Ala Gly Tyr Arg Val Asn His
 180 185 190
 Ala Val Asp Ala Leu Glu Ile Gly Phe Gln Ala Pro Glu Ala Ala Ala
 195 200 205
 Gly Glu Val Asp Gly Ala Arg Val His Asp Phe
 210 215

<210> 13
 <211> 777
 <212> DNA
 <213> *Neisseria gonorrhoeae*

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 ggtggctttt tcggcataca ggcgcataatg gcctttgttt accagcatca cgcggctgcg 180
 accttgattt ttgaacgata cttcgccgat gacaaattcg tcggcttggt attgcgcggc 240
 aacctgcgcg tatttcaaac cgacaaagcc gatttgccga ctggtaaaca ccacgccaat 300
 ggtgctgcgg cgcaaacgcg tgcgatatt cgggtagcgg ccccgcgta ttgcccgga 360
 atcttacctt ggtcggcggc ttcatgcagc aggggcagtt ggttggacgc gtcgcccgca 420
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 <213> *Neisseria gonorrhoeae*

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<210> 16

<211> 257

<212> PRT

<213> Neisseria meningitidis

<400> 16

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Met Cys Pro Ser Gln Gln Val Arg Gln Met Phe Gly Gly Arg Ala Tyr
      20             25             30

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Asp Phe Arg Ala Asp Lys Ala Ala Gly Gly Phe Phe Gly Ile Gln Ala
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His Met Ala Phe Val His Gln His His Ala Ala Ala Ala Leu Val Phe
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Glu Arg Tyr Phe Ala Asp Asp Lys Phe Val Gly Leu Val Leu Arg Gly
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Asn Leu Arg Val Phe Gln Thr Asp Lys Ala Asp Leu Arg Thr Gly Lys
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His His Ala Asp Gly Ala Ala Pro Gln Thr Ala Ala Asp Ile Arg Val
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Ala Ala Ala Leu Ser Pro Ala Ile Leu Pro Trp Ser Ala Ala Ser Cys
      115            120            125

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Ser Arg Gly Ser Trp Leu Asp Ala Ser Pro Ala Met Lys Ile Cys Gly
      130            135            140

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Ile Leu Val Cys Met Val Ser Gly Ser Ala Thr Gly Thr Pro Arg Ala
      145            150            155            160

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Ser Phe Ser Ile Leu Ile Phe Ser Lys Pro Ile Leu Ser Thr Phe Gly
      165            170            175

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Arg Arg Pro Thr Ala Ala Ser Ile Tyr Ser Ala Thr Asn Thr Pro Phe
      180            185            190

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Ser Pro Ser Cys Ser Gln Trp Thr Ser Thr Leu Pro Ser Ala Ser Ser
      195            200            205

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Leu Thr Ser Val Leu Ala Ser Arg Cys Ser Phe Asn Ser Ser Pro Asn

210

215

220

Thr Ala Phe Ala Ser Ser Glu Thr Thr Gly Ser Glu Met Pro Pro Met
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Ile Pro Pro Lys Pro Lys Ile Ser Thr Phe Thr Pro Lys Arg Cys Asn
245 250 255

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<210> 17

<211> 774

<212> DNA

<213> Neisseria meningitidis

<400> 17

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<210> 18

<211> 257

<212> PRT

<213> Neisseria meningitidis

<400> 18

Met Val Glu Arg His Ile Gln His Leu Arg Asn Gly His Leu His Leu
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Met Cys Pro Ser Gln Gln Val Arg Gln Met Phe Gly Gly Arg Thr Tyr
20 25 30

Asp Phe Cys Ala Asp Glu Ala Ala Gly Gly Phe Phe Gly Ile Gln Ala
35 40 45

His Met Ala Phe Val Tyr Gln His His Ala Ala Ala Ala Leu Val Phe
50 55 60

Glu Arg Tyr Phe Ala Asp Asp Lys Phe Val Gly Leu Val Leu Arg Gly
65 70 75 80

Asn Leu Arg Val Phe Gln Thr Asp Lys Ala Asp Leu Arg Thr Gly Glu

	85		90		95
His Tyr Ala Asp Gly Ala Ala Ala Gln Thr Ala Ala Asp Ile Arg Val	100		105		110
Ala Ala Ala Leu Ser Pro Ala Ile Leu Pro Trp Ser Ala Ala Ser Cys	115		120		125
Ser Arg Gly Ser Trp Leu Asp Ala Ser Pro Ala Ile Lys Ile Cys Gly	130		135		140
Ile Leu Val Cys Ile Val Ser Gly Ser Ala Thr Gly Thr Pro Arg Ala	145		150		155
Ser Phe Ser Ile Leu Met Phe Ser Lys Pro Ile Leu Ser Thr Phe Gly	165		170		175
Arg Arg Pro Thr Ala Ala Ser Ile Tyr Ser Ala Thr Asn Thr Pro Phe	180		185		190
Ser Pro Ser Cys Ser Gln Trp Thr Ser Thr Leu Pro Ser Ala Ser Ser	195		200		205
Leu Ala Ser Val Leu Ala Ser Lys Cys Ser Phe Asn Ser Ser Pro Asn	210		215		220
Thr Ala Phe Ala Ser Ser Glu Thr Thr Gly Ser Glu Met Pro Pro Met	225		230		235
Met Pro Pro Lys Pro Lys Ile Ser Thr Phe Thr Pro Lys Arg Cys Asn	245		250		255

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<210> 19
 <211> 1107
 <212> DNA
 <213> Neisseria gonorrhoeae

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 attgcgctga ttgtgttggc tatcgtacag agtaagaaac agtcggaaag cggcagtgtc 180
 gtactgacag atttttcggg aaattataaa aaacagcggc aatcgtttga aacattcttt 240
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 gccaaagcag agaaaaagcg tttgaaggag ggcggggaga aatctgccga aacgcaaaaa 360
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 gtgggtgtgg tggcggaagt gccgaatatc caccgcctgt tgaaaaaaca tgatattgat 720
 gtggatgtga tgacggcggg cgaatttaag cgcacggtta cttttatggg tgaaaatacg 780
 gaaaagggca aacagaaatt ccggcaggaa ctggaggaaa cgcatacgtt gttcaagcag 840
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gtcaaccggc gagcgatgt gatgtag 1107

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<210> 20
 <211> 368
 <212> PRT
 <213> *Neisseria gonorrhoeae*

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Gln Ser Met Trp Lys Glu Ile Leu Leu Asn Tyr Gly Ile Phe Leu Leu
      20              25              30

Glu Leu Leu Thr Val Phe Gly Ala Ile Ala Leu Ile Val Leu Ala Ile
      35              40              45

Val Gln Ser Lys Lys Gln Ser Glu Ser Gly Ser Val Val Leu Thr Asp
      50              55              60

Phe Ser Glu Asn Tyr Lys Lys Gln Arg Gln Ser Phe Glu Thr Phe Phe
      65              70              75              80

Leu Ser Glu Glu Glu Thr Lys His Gln Glu Lys Lys Glu Lys Lys Lys
      85              90              95

Glu Lys Ala Glu Ala Lys Ala Glu Lys Lys Arg Leu Lys Glu Gly Gly
      100             105             110

Glu Lys Ser Ala Glu Thr Gln Lys Ser Arg Leu Phe Val Leu Asp Phe
      115             120             125

Asp Gly Asp Leu Tyr Ala His Ala Val Glu Ser Leu Arg His Glu Ile
      130             135             140

Thr Ala Val Leu Leu Ile Ala Lys Pro Glu Asp Glu Val Leu Leu Arg
      145             150             155             160

Leu Glu Ser Pro Gly Gly Val Val His Gly Tyr Gly Leu Ala Ala Ser
      165             170             175

Gln Leu Arg Arg Leu Arg Glu Arg Asn Ile Pro Leu Thr Val Ala Val
      180             185             190

Asp Lys Val Ala Ala Ser Gly Gly Tyr Met Met Ala Cys Val Ala Asp
      195             200             205

Lys Ile Val Ser Ala Pro Phe Ala Val Ile Gly Ser Val Gly Val Val
      210             215             220

Ala Glu Val Pro Asn Ile His Arg Leu Leu Lys Lys His Asp Ile Asp
      225             230             235             240

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Val Asp Val Met Thr Ala Gly Glu Phe Lys Arg Thr Val Thr Phe Met
 245 250 255
 Gly Glu Asn Thr Glu Lys Gly Lys Gln Lys Phe Arg Gln Glu Leu Glu
 260 265 270
 Glu Thr His Gln Leu Phe Lys Gln Phe Val Ser Glu Asn Arg Pro Gly
 275 280 285
 Leu Asp Ile Glu Lys Ile Ala Thr Gly Glu His Trp Phe Gly Arg Gln
 290 295 300
 Ala Leu Ala Leu Asn Leu Ile Asp Glu Ile Ser Thr Ser Asp Asp Leu
 305 310 315 320
 Leu Leu Lys Ala Phe Glu Asn Lys Gln Val Ile Glu Val Lys Tyr Gln
 325 330 335
 Glu Lys Arg Ser Leu Ile Gln Arg Ile Gly Leu Gln Ala Glu Ala Ser
 340 345 350
 Val Glu Lys Leu Phe Ala Lys Leu Val Asn Arg Arg Ala Asp Val Met
 355 360 365

<210> 21
 <211> 1100
 <212> DNA
 <213> Neisseria meningitidis

<220>
 <221> misc_feature
 <222> (350)
 <223> N is any nucleotide

<220>
 <221> misc_feature
 <222> (374)..(581)
 <223> N is any nucleotide

<400> 21
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 attttactga attacgggtat tttcctgctc gaactgctta ccgtgttcgg cgcaattgcg 120
 ctgatttgtgt tggctatcgt acagagtaag aaacagtcgg awagcggcag tgtcgtactg 180
 acggattttt cggaaaatta taaaaaacag cggcaatcgt ttgaagcatt ctttttaagc 240
 ggggaagagg cacaacatca ggaaaaagag gaaaagaaaa aggaaaaggc ggaagccaaa 300
 gcagagaaaa acgtttgaag gaggttgggg agaaatctgc cgaaacgcan aaatcacgcc 360
 tttttgtggt ggannnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 420
 nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 480
 nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 540
 nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn ngcgagcggc gggtatatga 600
 tggcgtgtgt ggcggataaa attgcttccg ctccgtttgc gattgtcggg tcggtgggtg 660
 tgggtggcga agtaccgaat atccaccgcc tgttgaaaaa acatgatatt gatgtggatg 720

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tgatgacggc gggcgaattt aagcgcacgg ttacttttat gggtgaaaat acggaaaagg 780
gcaaacagaa attccgacag gaactggagg aaacgcatca gttgttcaag cagtttgtca 840
gcgagaaccg ccctcaattg gatattgagg aagtggcaac gggcgagcat tggttcggtc 900
ggcaggcggtt ggcgttgaac ttgattgacg agatttcgac cagtgatgat ttgttggtga 960
aagcgtttga aaacaaacag gttatcgaag tgaaatatca ggagaagcaa agcctgatcc 1020
agcgcattgg tttgcaggcg gaagcttctg ttgaaaagtt gtttgccaaa cttgtcaacc 1080
ggcgggcgga tgtgatgtag                                     1100

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<210> 22
<211> 366
<212> PRT
<213> Neisseria meningitidis

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<220>
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<222> (54)
<223> Xaa is any amino acid

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<220>
<221> UNSURE
<222> (104)
<223> Xaa is any amino acid

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<220>
<221> UNSURE
<222> (117)
<223> Xaa is any amino acid

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<220>
<221> UNSURE
<222> (125)..(194)
<223> Xaa is any amino acid

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<400> 22
Met Asp Asn Ile Asp Met Phe Met Pro Glu Gln Glu Glu Ile Gln Ser
  1             5             10             15

Met Trp Lys Glu Ile Leu Leu Asn Tyr Gly Ile Phe Leu Leu Glu Leu
      20             25             30

Leu Thr Val Phe Gly Ala Ile Ala Leu Ile Val Leu Ala Ile Val Gln
      35             40             45

Ser Lys Lys Gln Ser Xaa Ser Gly Ser Val Val Leu Thr Asp Phe Ser
      50             55             60

Glu Asn Tyr Lys Lys Gln Arg Gln Ser Phe Glu Ala Phe Phe Leu Ser
      65             70             75             80

Gly Glu Glu Ala Gln His Gln Glu Lys Glu Glu Lys Lys Lys Glu Lys
      85             90             95

Ala Glu Ala Lys Ala Glu Lys Xaa Arg Leu Lys Glu Gly Gly Glu Lys
      100            105            110

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Ser Ala Glu Thr Xaa Lys Ser Arg Leu Phe Val Leu Xaa Xaa Xaa Xaa
115 120 125

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
130 135 140

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
145 150 155 160

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
165 170 175

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
180 185 190

Xaa Xaa Ala Ser Gly Gly Tyr Met Met Ala Cys Val Ala Asp Lys Ile
195 200 205

Ala Ser Ala Pro Phe Ala Ile Val Gly Ser Val Gly Val Val Ala Glu
210 215 220

Val Pro Asn Ile His Arg Leu Leu Lys Lys His Asp Ile Asp Val Asp
225 230 235 240

Val Met Thr Ala Gly Glu Phe Lys Arg Thr Val Thr Phe Met Gly Glu
245 250 255

Asn Thr Glu Lys Gly Lys Gln Lys Phe Arg Gln Glu Leu Glu Glu Thr
260 265 270

His Gln Leu Phe Lys Gln Phe Val Ser Glu Asn Arg Pro Gln Leu Asp
275 280 285

Ile Glu Glu Val Ala Thr Gly Glu His Trp Phe Gly Arg Gln Ala Leu
290 295 300

Ala Leu Asn Leu Ile Asp Glu Ile Ser Thr Ser Asp Asp Leu Leu Leu
305 310 315 320

Lys Ala Phe Glu Asn Lys Gln Val Ile Glu Val Lys Tyr Gln Glu Lys
325 330 335

Gln Ser Leu Ile Gln Arg Ile Gly Leu Gln Ala Glu Ala Ser Val Glu
340 345 350

Lys Leu Phe Ala Lys Leu Val Asn Arg Arg Ala Asp Val Met
355 360 365

<210> 23

<211> 1101

<212> DNA

<213> Neisseria meningitidis

<400> 23

atggacaata ttgacatgtt catgcctgaa caagaggaaa tccaatcaat gtggaaagaa 60
attttactga attacggtat tttcctgctc gaactgctta ccgtgttcgg cgcaattgcg 120


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ctgatttgtt tggctatcgt acagagtaag aaacagtcgg aaagcggcag tgtcgtactg 180
acggattttt cggaaaatta taaaaaacag cggcaatcgt ttgaagcatt ctttttaagc 240
ggggaagagg caaaacatca ggaaaaagag gaaaagaaaa aggaaaaggc ggaagccaaa 300
gcagagaaaa agcgtttgaa ggagggtggg gagaaatctt ccgaaacgca aaaatcccg 360
cttttttgtt tggattttga cggcgatttg tatgcacacg ccgtagaatc cttgcgtcat 420
gagattacgg cgggtgctttt gattgccaag cctgaagatg aggttctgct tagattggaa 480
agtcggggcg gcgtggttca cggttacggg ttggcgggctt cgcagcttag gcgtttgcgc 540
gaacgcaata ttccgctgac cgtcgccgtc gataaggtgg cggcgagcgg tggttatatg 600
atggcgtgtg tggcggataa aattgtttcc gctccgtttg cgattgtcgg ttcgggtggg 660
gttgtagcgg aagtaccgaa tatccaccgc ctgttgaaaa aacatgatat tgatgtggat 720
gtgatgacgg cgggcgaatt taagcgcacg gttactttta tgggtgaaaa tacggaaaag 780
ggcaaacaga aattccgaca ggaactggag gaaacgcac agttgttcaa gcagtttgtc 840
agcgagaacc gccctcaatt ggatattgag gaagtggcaa cgggcgagca ttggttcggg 900
cggcaggcgt tggcgttgaa cttgattgac gagatttcga ccagtgatga tttgttggtt 960
aaagcgtttg aaaacaaaca ggttatcgaa gtgaaatatc aggagaagca aagcctgatc 1020
cagcgatttg gtttgcaggc ggaagcttct gttgaaaagt tgtttgcaa acttgtcaac 1080
cggcggggcg atgtgatgta g 1101

```

<210> 24

<211> 366

<212> PRT

<213> *Neisseria meningitidis*

<400> 24

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Met Asp Asn Ile Asp Met Phe Met Pro Glu Gln Glu Glu Ile Gln Ser
  1             5             10             15

```

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Met Trp Lys Glu Ile Leu Leu Asn Tyr Gly Ile Phe Leu Leu Glu Leu
          20             25             30

```

```

Leu Thr Val Phe Gly Ala Ile Ala Leu Ile Val Leu Ala Ile Val Gln
          35             40             45

```

```

Ser Lys Lys Gln Ser Glu Ser Gly Ser Val Val Leu Thr Asp Phe Ser
          50             55             60

```

```

Glu Asn Tyr Lys Lys Gln Arg Gln Ser Phe Glu Ala Phe Phe Leu Ser
          65             70             75             80

```

```

Gly Glu Glu Ala Lys His Gln Glu Lys Glu Glu Lys Lys Lys Glu Lys
          85             90             95

```

```

Ala Glu Ala Lys Ala Glu Lys Lys Arg Leu Lys Glu Gly Gly Glu Lys
          100            105            110

```

```

Ser Ser Glu Thr Gln Lys Ser Arg Leu Phe Val Leu Asp Phe Asp Gly
          115            120            125

```

```

Asp Leu Tyr Ala His Ala Val Glu Ser Leu Arg His Glu Ile Thr Ala
          130            135            140

```

```

Val Leu Leu Ile Ala Lys Pro Glu Asp Glu Val Leu Leu Arg Leu Glu
          145            150            155            160

```

```

Ser Pro Gly Gly Val Val His Gly Tyr Gly Leu Ala Ala Ser Gln Leu
          165            170            175

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Arg Arg Leu Arg Glu Arg Asn Ile Pro Leu Thr Val Ala Val Asp Lys
 180 185 190
 Val Ala Ala Ser Gly Gly Tyr Met Met Ala Cys Val Ala Asp Lys Ile
 195 200 205
 Val Ser Ala Pro Phe Ala Ile Val Gly Ser Val Gly Val Val Ala Glu
 210 215 220
 Val Pro Asn Ile His Arg Leu Leu Lys Lys His Asp Ile Asp Val Asp
 225 230 235 240
 Val Met Thr Ala Gly Glu Phe Lys Arg Thr Val Thr Phe Met Gly Glu
 245 250 255
 Asn Thr Glu Lys Gly Lys Gln Lys Phe Arg Gln Glu Leu Glu Glu Thr
 260 265 270
 His Gln Leu Phe Lys Gln Phe Val Ser Glu Asn Arg Pro Gln Leu Asp
 275 280 285
 Ile Glu Glu Val Ala Thr Gly Glu His Trp Phe Gly Arg Gln Ala Leu
 290 295 300
 Ala Leu Asn Leu Ile Asp Glu Ile Ser Thr Ser Asp Asp Leu Leu Leu
 305 310 315 320
 Lys Ala Phe Glu Asn Lys Gln Val Ile Glu Val Lys Tyr Gln Glu Lys
 325 330 335
 Gln Ser Leu Ile Gln Arg Ile Gly Leu Gln Ala Glu Ala Ser Val Glu
 340 345 350
 Lys Leu Phe Ala Lys Leu Val Asn Arg Arg Ala Asp Val Met
 355 360 365

<210> 25
 <211> 462
 <212> DNA
 <213> Neisseria gonorrhoeae

<400> 25
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 ttatggcttt tgccacgttt tgccgccatc agcgaaaacc tgtatttccg cctgaacaac 120
 agcttggaac gcgacaacca ctttatccga aaaggcgacg agcggcagct gtaccgccat 180
 tacggactgg tttcgcgcct gcgtgtgctg atttccaacc gcgaagcctt cggctatctc 240
 tgcgtcggcg cggcgatggg tattttgttc ggctttgctt ttgtgatgat gacgtcaaa 300
 ggctacggca gcgcggggca tatttattcg gtcggcactt atctgtggat gtttgccatg 360
 agtttgacg atgtgccgcg attggtcgaa caatattcca atttgaaaga catcggacaa 420
 cggatagagt ggtcggaacg gaacatcaaa gccggaactt ga 462

<210> 26
 <211> 153
 <212> PRT

<213> Neisseria gonorrhoeae

<400> 26

Met Leu Leu Val Leu Glu Phe Trp Phe Gly Val Ser Ala Val Gly Ile
1 5 10 15
Leu Ala Leu Phe Leu Trp Leu Leu Pro Arg Phe Ala Ala Ile Ser Glu
20 25 30
Asn Leu Tyr Phe Arg Leu Asn Asn Ser Leu Glu Arg Asp Asn His Phe
35 40 45
Ile Arg Lys Gly Asp Glu Arg Gln Leu Tyr Arg His Tyr Gly Leu Val
50 55 60
Ser Arg Leu Arg Val Leu Ile Ser Asn Arg Glu Ala Phe Gly Tyr Leu
65 70 75 80
Cys Val Gly Ala Ala Met Gly Ile Leu Phe Gly Phe Ala Phe Val Met
85 90 95
Met Thr Leu Lys Gly Tyr Gly Ser Ala Gly His Ile Tyr Ser Val Gly
100 105 110
Thr Tyr Leu Trp Met Phe Ala Met Ser Leu Asp Asp Val Pro Arg Leu
115 120 125
Val Glu Gln Tyr Ser Asn Leu Lys Asp Ile Gly Gln Arg Ile Glu Trp
130 135 140
Ser Glu Arg Asn Ile Lys Ala Gly Thr
145 150

<210> 27

<211> 462

<212> DNA

<213> Neisseria meningitidis

<400> 27

atgctgctgg tgctggaatt ttgggtcggc gtgtcggcgg tgggcataact tgcgttgttt 60
ttatggcttt tgccacgttt tgccgccatc agcgaaaacc tgtatttccg cctgaacaac 120
agcttggaac gcgacaacca ctttatccga aaaggcgacc ggcggcagct gtaccgccat 180
tacggactgc ttgcgcgcct gcgtgtgctg atttccaacc gcgaagcctt cggctatctc 240
tgcgtcggca cgcgatggg tattttgttc ggctttgctt ttgtgatgat gacgctcaaa 300
ggctacagca gcgcggggca tgtctattcg gtcggcactt atctgtggat gtttgccatg 360
agtttgacg acgtgccgcg attggtcgaa caatattcca atttgaaaga catcggacaa 420
cggatagagt ggtcggaaacg gaacatcaaa gccggaactt ga 462

<210> 28

<211> 153

<212> PRT

<213> Neisseria meningitidis

<400> 28

Met Leu Leu Val Leu Glu Phe Trp Val Gly Val Ser Ala Val Gly Ile

1	5	10	15
Leu Ala Leu Phe Leu Trp Leu Leu Pro Arg Phe Ala Ala Ile Ser Glu			
20	25	30	
Asn Leu Tyr Phe Arg Leu Asn Asn Ser Leu Glu Arg Asp Asn His Phe			
35	40	45	
Ile Arg Lys Gly Asp Arg Arg Gln Leu Tyr Arg His Tyr Gly Leu Leu			
50	55	60	
Ala Arg Leu Arg Val Leu Ile Ser Asn Arg Glu Ala Phe Gly Tyr Leu			
65	70	75	80
Cys Val Gly Thr Ala Met Gly Ile Leu Phe Gly Phe Ala Phe Val Met			
85	90	95	
Met Thr Leu Lys Gly Tyr Ser Ser Ala Gly His Val Tyr Ser Val Gly			
100	105	110	
Thr Tyr Leu Trp Met Phe Ala Met Ser Leu Asp Asp Val Pro Arg Leu			
115	120	125	
Val Glu Gln Tyr Ser Asn Leu Lys Asp Ile Gly Gln Arg Ile Glu Trp			
130	135	140	
Ser Glu Arg Asn Ile Lys Ala Gly Thr			
145	150		

<210> 29
 <211> 462
 <212> DNA
 <213> Neisseria meningitidis

<400> 29
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 ttatggcttt tgccacgttt tgccgccatc agcgaaaacc tgtatttccg cctgaagaac 120
 agcttggaac gcgacaacca ctttatccga aaaggcgacg agcggcagct ggaccgccat 180
 tacggactgc ttgcgcgcct gcgtgtgctg atttccaacc gcgaagcctt cggctatctc 240
 tgcgtcggca cggcgatggg tattttgttc ggctttgctt ttgtgatgat gacgctcaaa 300
 ggctacagca gcgcggggca tgtctattcg gtcggcactt atctgtggat gtttgccata 360
 agtttgacg acgtgccgcg attggtcgaa caatattcca atttgaaaga catcggacaa 420
 cggatagagt ggtcgaaaacg gaacatcaaa gccggaactt ga 462

<210> 30
 <211> 153
 <212> PRT
 <213> Neisseria meningitidis

<400> 30
 Met Leu Leu Val Leu Glu Phe Trp Val Gly Val Ser Ala Val Gly Ile
 1 5 10 15
 Leu Ala Leu Phe Leu Trp Leu Leu Pro Arg Phe Ala Ala Ile Ser Glu

20	25	30
Asn Leu Tyr Phe Arg Leu Lys Asn Ser Leu Glu Arg Asp Asn His Phe		
35	40	45
Ile Arg Lys Gly Asp Glu Arg Gln Leu Asp Arg His Tyr Gly Leu Leu		
50	55	60
Ala Arg Leu Arg Val Leu Ile Ser Asn Arg Glu Ala Phe Gly Tyr Leu		
65	70	75
Cys Val Gly Thr Ala Met Gly Ile Leu Phe Gly Phe Ala Phe Val Met		
85	90	95
Met Thr Leu Lys Gly Tyr Ser Ser Ala Gly His Val Tyr Ser Val Gly		
100	105	110
Thr Tyr Leu Trp Met Phe Ala Ile Ser Leu Asp Asp Val Pro Arg Leu		
115	120	125
Val Glu Gln Tyr Ser Asn Leu Lys Asp Ile Gly Gln Arg Ile Glu Trp		
130	135	140
Ser Lys Arg Asn Ile Lys Ala Gly Thr		
145	150	

<210> 31
 <211> 867
 <212> DNA
 <213> *Neisseria gonorrhoeae*

<400> 31
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 tcccgggtcg gactggaaaa ccttttgatg ctgggggtatc cggtgttttg cggtctgggcg 120
 attaattgccg tgattgcggg gaggggtgtg caggcggtgc tgtacgcttt gggtgtattt 180
 ttgatgtggc tggtcgggtgc ggcacggcgg attgccgata cgcgcacgtt tacgcggatt 240
 tataccgaaa tcgccgtgcc ggttgtgttg gaacaacggc agcggcaagt cccgcattca 300
 gcggttaactg cacgggttgc cctgtcgcgt gaatttgtca gcttttttga agaacacctg 360
 ccgattgccg cgacatccgt cgtatccata ttcggcgcgt gcatcatgct gctgggtgctg 420
 gaattttggg tcggcgtgtc ggcgggtggc atacttgcgt tgtttttatg gcttttgcca 480
 cgttttgccg ccatcagcga aaacctgtat ttccgcctga acaacagctt ggaacgcgac 540
 aaccacttta tccgaaaagg cgacgagcgg cagctgtacc gccattacgg actggtttcg 600
 cgctgcgtg tgctgatttc caaccgcgaa gccttcggct atctctgcgt cggcgcggcg 660
 atgggtattt tgctcggtt tgcttttgtg atgatgacgc tcaaaggcta cggcagcgcg 720
 gggcatattt attcggtcgg cacttatctg tggatgtttg ccatgagttt ggacgatgtg 780
 ccgcgatttg tcgaacaata ttccaatttg aaagacatcg gacaacggat agagtggctg 840
 gaacggaaca tcaaagccgg aacttga 867

<210> 32
 <211> 288
 <212> PRT
 <213> *Neisseria gonorrhoeae*

<400> 32
 Met Trp Lys Met Leu Lys His Ile Ala Lys Thr His Arg Lys Arg Leu

1	5	10	15
Ile Gly Thr Phe Ser Pro Val Gly Leu Glu Asn Leu Leu Met Leu Gly	20	25	30
Tyr Pro Val Phe Gly Gly Trp Ala Ile Asn Ala Val Ile Ala Gly Arg	35	40	45
Val Trp Gln Ala Leu Leu Tyr Ala Leu Val Val Phe Leu Met Trp Leu	50	55	60
Val Gly Ala Ala Arg Arg Ile Ala Asp Thr Arg Thr Phe Thr Arg Ile	65	70	75
Tyr Thr Glu Ile Ala Val Pro Val Val Leu Glu Gln Arg Gln Arg Gln	85	90	95
Val Pro His Ser Ala Val Thr Ala Arg Val Ala Leu Ser Arg Glu Phe	100	105	110
Val Ser Phe Phe Glu Glu His Leu Pro Ile Ala Ala Thr Ser Val Val	115	120	125
Ser Ile Phe Gly Ala Cys Ile Met Leu Leu Val Leu Glu Phe Trp Val	130	135	140
Gly Val Ser Ala Val Gly Ile Leu Ala Leu Phe Leu Trp Leu Leu Pro	145	150	155
Arg Phe Ala Ala Ile Ser Glu Asn Leu Tyr Phe Arg Leu Asn Asn Ser	165	170	175
Leu Glu Arg Asp Asn His Phe Ile Arg Lys Gly Asp Glu Arg Gln Leu	180	185	190
Tyr Arg His Tyr Gly Leu Val Ser Arg Leu Arg Val Leu Ile Ser Asn	195	200	205
Arg Glu Ala Phe Gly Tyr Leu Cys Val Gly Ala Ala Met Gly Ile Leu	210	215	220
Phe Gly Phe Ala Phe Val Met Met Thr Leu Lys Gly Tyr Gly Ser Ala	225	230	235
Gly His Ile Tyr Ser Val Gly Thr Tyr Leu Trp Met Phe Ala Met Ser	245	250	255
Leu Asp Asp Val Pro Arg Leu Val Glu Gln Tyr Ser Asn Leu Lys Asp	260	265	270
Ile Gly Gln Arg Ile Glu Trp Ser Glu Arg Asn Ile Lys Ala Gly Thr	275	280	285

<210> 33
 <211> 867
 <212> DNA
 <213> Neisseria meningitidis

<400> 33
 atgtggaaaa tgttgaaaca catagcccaa acccaccgca agcgattgat tggcacattt 60
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 atcaatgccg tgattgcggg ggaggtgtgg caggcgttgc tgtacgcttt ggttgtgctt 180
 ttgatgtggc tggtcggtgc ggtgcggcgg attgccgata cgcgcacggt tacgcggatt 240
 tataccgaaa tcgccgtgcc ggtcgtgttg gaacagcggc agcgacaagt cccgcattcg 300
 gcggttaactg cgcgggttgc cctgtcgcgt gagtttgtca gcttttttga agaacacctg 360
 ccgattgccg cgacatccgt cgtatccata ttcggcgcgt gcatcatgct gctggtgctg 420
 gaattttggg tcggcgtgtc ggcggtgggc atacttgcgt tgtttttatg gcttttgcca 480
 cgttttgccg ccatcagcga aaacctgtat ttccgcctga acaacagctt ggaacgcgac 540
 aaccacttta tccgaaaagg cgaccggcgg cagctgtacc gccattacgg actgcttgcg 600
 cgctgcgctg tgctgatttc caaccgcgaa gccttcggct atctctgcgt cggcacggcg 660
 atgggtattt tgctcggtt tgcttttgtg atgatgacgc tcaaaggcta cagcagcgcg 720
 gggcatgtct attcggtcgg cacttatctg tggatgtttg ccatgagttt ggacgacgtg 780
 ccgcgattgg tcgaacaata ttccaatttg aaagacatcg gacaacggat agagtggctg 840
 gaacggaaca tcaaagccgg aacttga 867

<210> 34
 <211> 288
 <212> PRT
 <213> Neisseria meningitidis

<400> 34
 Met Trp Lys Met Leu Lys His Ile Ala Gln Thr His Arg Lys Arg Leu
 1 5 10 15
 Ile Gly Thr Phe Ser Leu Val Gly Leu Glu Asn Leu Leu Met Leu Val
 20 25 30
 Tyr Pro Val Phe Gly Gly Arg Ala Ile Asn Ala Val Ile Ala Gly Glu
 35 40 45
 Val Trp Gln Ala Leu Leu Tyr Ala Leu Val Val Leu Leu Met Trp Leu
 50 55 60
 Val Gly Ala Val Arg Arg Ile Ala Asp Thr Arg Thr Phe Thr Arg Ile
 65 70 75 80
 Tyr Thr Glu Ile Ala Val Pro Val Val Leu Glu Gln Arg Gln Arg Gln
 85 90 95
 Val Pro His Ser Ala Val Thr Ala Arg Val Ala Leu Ser Arg Glu Phe
 100 105 110
 Val Ser Phe Phe Glu Glu His Leu Pro Ile Ala Ala Thr Ser Val Val
 115 120 125
 Ser Ile Phe Gly Ala Cys Ile Met Leu Leu Val Leu Glu Phe Trp Val
 130 135 140

Gly Val Ser Ala Val Gly Ile Leu Ala Leu Phe Leu Trp Leu Leu Pro
 145 150 155 160
 Arg Phe Ala Ala Ile Ser Glu Asn Leu Tyr Phe Arg Leu Asn Asn Ser
 165 170 175
 Leu Glu Arg Asp Asn His Phe Ile Arg Lys Gly Asp Arg Arg Gln Leu
 180 185 190
 Tyr Arg His Tyr Gly Leu Leu Ala Arg Leu Arg Val Leu Ile Ser Asn
 195 200 205
 Arg Glu Ala Phe Gly Tyr Leu Cys Val Gly Thr Ala Met Gly Ile Leu
 210 215 220
 Phe Gly Phe Ala Phe Val Met Met Thr Leu Lys Gly Tyr Ser Ser Ala
 225 230 235 240
 Gly His Val Tyr Ser Val Gly Thr Tyr Leu Trp Met Phe Ala Met Ser
 245 250 255
 Leu Asp Asp Val Pro Arg Leu Val Glu Gln Tyr Ser Asn Leu Lys Asp
 260 265 270
 Ile Gly Gln Arg Ile Glu Trp Ser Glu Arg Asn Ile Lys Ala Gly Thr
 275 280 285

<210> 35
 <211> 843
 <212> DNA
 <213> Neisseria meningitidis

<400> 35
 agccaaaacc accgcaagcg attgattggc acatttttttc tggtcggact ggaaaacctt 60
 ttgatgctgg tgtatccggt gtttggcggc tgggcgatta atgccgtgat tgcggggcag 120
 gcgtggcagg cggttgcgtgta cgctttgggt gtgcttttga tgtggctggt cggcgccgag 180
 cggcggtatt cggatacgcg cacgtttacg cggatttata ccgaaatcgc cgtgccggtt 240
 gtgttggaac agcggcagcg gcaagtcccg cattcggcgg taactgcgcg ggttgccctg 300
 tcgcgtgagt ttgtcagctt ttttgaagaa cacctgccga ttgccgcgac atccgctcgt 360
 tccatattcg gcgcgtgcat catgctgctg gtgctggaat tttgggtcgg cgtgtcggcg 420
 gtgggcatac ttgcgttggt tttatggctt ttgccacggt ttgccgccat cagcgaaaaac 480
 ctgtattttcc gcctgaagaa cagcttggaa cgcgacaacc actttatccg aaaaggcgac 540
 gagcggcagc tggaccgcca ttacggactg cttgcgcgcc tgcgtgtgct gattttccaac 600
 cgcgaagcct tcggctatct ctgcgtcggc acggcgatgg gtattttggt cggctttgct 660
 tttgtgatga tgacgctcaa aggtacacag agcgcggggc atgtctattc ggtcggcact 720
 tatctgtgga tgtttgccat aagtttggac gacgtgccgc gattggtcga acaatattcc 780
 aatttgaaag acatcggaca acggatagag tggtcgaaac ggaacatcaa agccggaact 840
 tga 843

<210> 36
 <211> 280
 <212> PRT

<400> 36

Lys Arg Asn Ile Lys Ala Gly Thr
275 280

<210> 37
<211> 342
<212> DNA
<213> *Neisseria gonorrhoeae*

<400> 37
atgaacacaa cccgactgcc gaccgccttc atcttgtgct gcctctgcgc cgccgcttct 60
gccgccgaca acagcatcat gacaaaaggg caaaaagtgt acgaatccaa ctgcatcgcc 120
tgccacggca agaaagggga agggcgcggc actgcgtttc ctccgctttt ccggtcggac 180
tgtattatga acaaaccgca cgtcctgctg cacagcatgg tcaaaggcat cgacgggaca 240
ttcaaagtgg agcggcaaaa cctacgacgg atttatgccc gcaaccgcca tcagcgatgc 300
ggacattgcc gccgtcgcca cttatatcat gaacgccttt ga 342

<210> 38
<211> 113
<212> PRT
<213> *Neisseria gonorrhoeae*

<400> 38
Met Asn Thr Thr Arg Leu Pro Thr Ala Phe Ile Leu Cys Cys Leu Cys
1 5 10 15
Ala Ala Ala Ser Ala Ala Asp Asn Ser Ile Met Thr Lys Gly Gln Lys
20 25 30
Val Tyr Glu Ser Asn Cys Ile Ala Cys His Gly Lys Lys Gly Glu Gly
35 40 45
Arg Gly Thr Ala Phe Pro Pro Leu Phe Arg Ser Asp Cys Ile Met Asn
50 55 60
Lys Pro His Val Leu Leu His Ser Met Val Lys Gly Ile Asp Gly Thr
65 70 75 80
Phe Lys Val Glu Arg Gln Asn Leu Arg Arg Ile Tyr Ala Arg Asn Arg
85 90 95
His Gln Arg Cys Gly His Cys Arg Arg Arg His Leu Tyr His Glu Arg
100 105 110
Leu

<210> 39
<211> 341
<212> DNA
<213> *Neisseria meningitidis*

<400> 39
atgaacacaa cccgactgcc gaccgccttc gtcttgggct gcttctgcgc cgccgcttct 60
gccgccgaca acagcatcat gacaaaaggg caaaaagtgt acgaatccaa ctgctcgcc 120
tgccacggca aaaagggcga agggcgcgga accatgtttc cgccgctcta ccgctccgac 180
ttcatcatga aaaaaccgca ggtgctgctg cacagcatgg tcaaaggcat caacggtaca 240

atcaaagtca acggcaaaac ctacaacgga ttcatgcccg caaccgccat cagcgatgcg 300
gacattgccg ccgtcgccac ttatatcatg aacgcctttg a 341

<210> 40
<211> 113
<212> PRT
<213> Neisseria meningitidis

<220>
<221> UNSURE
<222> (84)
<223> Xaa is any amino acid

<400> 40
Met Asn Thr Thr Arg Leu Pro Thr Ala Leu Val Leu Gly Cys Phe Cys
1 5 10 15
Ala Ala Ala Ser Ala Ala Asp Asn Ser Ile Met Thr Lys Gly Gln Lys
20 25 30
Val Tyr Glu Ser Asn Cys Val Ala Cys His Gly Lys Lys Gly Glu Gly
35 40 45
Arg Gly Thr Met Phe Pro Pro Leu Tyr Arg Ser Asp Phe Ile Met Lys
50 55 60
Lys Pro Gln Val Leu Leu His Ser Met Val Lys Gly Ile Asn Gly Thr
65 70 75 80
Ile Lys Val Xaa Arg Gln Asn Leu Gln Arg Ile His Ala Arg Asn Arg
85 90 95
His Gln Arg Cys Gly His Cys Arg Arg Arg His Leu Tyr His Glu Arg
100 105 110
Leu

<210> 41
<211> 341
<212> DNA
<213> Neisseria meningitidis

<400> 41
atgaacacaa cccgactgcc gaccgccctc gtcttgggct gcctctgcgc cgccgcttct 60
gccgccgaca acagcatcat gaçaaaaggg caaaaagtgt acgaatccaa ctgcgtcgcc 120
tgccacggca aaaagggcga aggccgcgga accatgtttc cgccgctcta ccgctccgac 180
ttcatcatga aaaaaccgca ggtgctgctg cacagcatgg tcaaaggcat caacggtaca 240
atcaaagtca acggcaaaac ctacaacgga ttcatgcccg ccaactgccat cagcgatgcg 300
gacattgccg ccgtcgccac ttatatcatg aacgcctttg a 341

<210> 42
<211> 341

<212> PRT

<213> *Neisseria meningitidis*

<400> 42

Ala Thr Gly Ala Ala Cys Ala Cys Ala Ala Cys Cys Cys Gly Ala Cys
1 5 10 15
Thr Gly Cys Cys Gly Ala Cys Cys Gly Cys Cys Cys Thr Cys Gly Thr
20 25 30
Cys Thr Thr Gly Gly Gly Cys Thr Gly Cys Cys Thr Cys Thr Gly Cys
35 40 45
Gly Cys Cys Gly Cys Cys Gly Cys Thr Thr Cys Thr Gly Cys Cys Gly
50 55 60
Cys Cys Gly Ala Cys Ala Ala Cys Ala Gly Cys Ala Thr Cys Ala Thr
65 70 75 80
Gly Ala Cys Ala Ala Ala Ala Gly Gly Gly Cys Ala Ala Ala Ala Ala
85 90 95
Gly Thr Gly Thr Ala Cys Gly Ala Ala Thr Cys Cys Ala Ala Cys Thr
100 105 110
Gly Cys Gly Thr Cys Gly Cys Cys Thr Gly Cys Cys Ala Cys Gly Gly
115 120 125
Cys Ala Ala Ala Ala Ala Gly Gly Gly Cys Gly Ala Ala Gly Gly Cys
130 135 140
Cys Gly Cys Gly Gly Ala Ala Cys Cys Ala Thr Gly Thr Thr Thr Cys
145 150 155 160
Cys Gly Cys Cys Gly Cys Thr Cys Thr Ala Cys Cys Gly Cys Thr Cys
165 170 175
Cys Gly Ala Cys Thr Thr Cys Ala Thr Cys Ala Thr Gly Ala Ala Ala
180 185 190
Ala Ala Ala Cys Cys Gly Cys Ala Gly Gly Thr Gly Cys Thr Gly Cys
195 200 205
Thr Gly Cys Ala Cys Ala Gly Cys Ala Thr Gly Gly Thr Cys Ala Ala
210 215 220
Ala Gly Gly Cys Ala Thr Cys Ala Ala Cys Gly Gly Thr Ala Cys Ala
225 230 235 240
Ala Thr Cys Ala Ala Ala Gly Thr Cys Ala Ala Cys Gly Gly Cys Ala
245 250 255
Ala Ala Ala Cys Cys Thr Ala Cys Ala Ala Cys Gly Gly Ala Thr Thr
260 265 270
Cys Ala Thr Gly Cys Cys Cys Gly Cys Cys Ala Cys Thr Gly Cys Cys
275 280 285

Ala Thr Cys Ala Gly Cys Gly Ala Thr Gly Cys Gly Gly Ala Cys Ala
290 295 300

Thr Thr Gly Cys Cys Gly Cys Cys Gly Thr Cys Gly Cys Cys Ala Cys
305 310 315 320

Thr Thr Ala Thr Ala Thr Cys Ala Thr Gly Ala Ala Cys Gly Cys Cys
325 330 335

Thr Thr Thr Gly Ala
340

<210> 43
<211> 399
<212> DNA
<213> Neisseria gonorrhoeae

<400> 43
atgaacacaa cccgactgcc gaccgccttc atcttggtgt gcctctgcgc cgccgcttct 60
gccgccgaca acagcatcat gacaaaagg caaaaagtgt acgaatccaa ctgcatcgcc 120
tgccacggca agaaagggga agggcgcggc actgcgtttc ctccgctttt ccggtcggac 180
tatattatga acaaaccgca cgtcctgctg cacagcatgg tcaaaggcat caacggtaca 240
atcaaagtca acggcaaaac ctacaacgga ttcatgcccg caaccgccat cagcgatgcg 300
gacattgccg ccgtcgccac ttatatcatg aacgcctttg acaacggcgg cggaagcggt 360
accgaaaaag acgtaaaaca ggcaaaaggc aaaaaaac 399

<210> 44
<211> 133
<212> PRT
<213> Neisseria gonorrhoeae

<400> 44
Met Asn Thr Thr Arg Leu Pro Thr Ala Phe Ile Leu Cys Cys Leu Cys
1 5 10 15
Ala Ala Ala Ser Ala Ala Asp Asn Ser Ile Met Thr Lys Gly Gln Lys
20 25 30
Val Tyr Glu Ser Asn Cys Ile Ala Cys His Gly Lys Lys Gly Glu Gly
35 40 45
Arg Gly Thr Ala Phe Pro Pro Leu Phe Arg Ser Asp Tyr Ile Met Asn
50 55 60
Lys Pro His Val Leu Leu His Ser Met Val Lys Gly Ile Asn Gly Thr
65 70 75 80
Ile Lys Val Asn Gly Lys Thr Tyr Asn Gly Phe Met Pro Ala Thr Ala
85 90 95
Ile Ser Asp Ala Asp Ile Ala Ala Val Ala Thr Tyr Ile Met Asn Ala
100 105 110
Phe Asp Asn Gly Gly Gly Ser Val Thr Glu Lys Asp Val Lys Gln Ala

115

120

125

Lys Gly Lys Lys Asn
130

<210> 45

<211> 402

<212> DNA

<213> Neisseria meningitidis

<400> 45

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atgaacacaa cccgactgcc gaccgccctc gtcttgggct gcttctgcgc cgccgcttct 60
gccgccgaca acagcatcat gacaaaaggg caaaaagtgt acgaatccaa ctgcgtcgcc 120
tgccacggca aaaagggcga aggccgcgga accatgtttc cgccgctcta ccgctccgac 180
ttcatcatga aaaaaccgca ggtgctgctg cacagcatgg tcaaaggcat caacggtaca 240
atcaaagtca acggcaaaac ctacaacgga ttcatgcccc caaccgccat cagcgatgcg 300
gacattgccg ccgtcgccac ttatatcatg aacgcctttg acaacggcgg cggaagcggt 360
accgaaaaag acgtaaaaca ggcaaaaagc aaaaaaaact aa 402

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<210> 46

<211> 133

<212> PRT

<213> Neisseria meningitidis

<400> 46

```

Met Asn Thr Thr Arg Leu Pro Thr Ala Leu Val Leu Gly Cys Phe Cys
 1             5             10             15

Ala Ala Ala Ser Ala Ala Asp Asn Ser Ile Met Thr Lys Gly Gln Lys
      20             25             30

Val Tyr Glu Ser Asn Cys Val Ala Cys His Gly Lys Lys Gly Glu Gly
      35             40             45

Arg Gly Thr Met Phe Pro Pro Leu Tyr Arg Ser Asp Phe Ile Met Lys
      50             55             60

Lys Pro Gln Val Leu Leu His Ser Met Val Lys Gly Ile Asn Gly Thr
      65             70             75             80

Ile Lys Val Asn Gly Lys Thr Tyr Asn Gly Phe Met Pro Ala Thr Ala
      85             90             95

Ile Ser Asp Ala Asp Ile Ala Ala Val Ala Thr Tyr Ile Met Asn Ala
      100            105            110

Phe Asp Asn Gly Gly Gly Ser Val Thr Glu Lys Asp Val Lys Gln Ala
      115            120            125

Lys Ser Lys Lys Asn
      130

```

<210> 47

<211> 396
<212> DNA
<213> *Neisseria meningitidis*

<400> 47
atgaacacaa cccgactgcc gaccgccctc gtcttgggct gcctctgcgc cgccgcttct 60
gccgccgaca acagcatcat gacaaaaggg caaaaagtgt acgaatccaa ctgcgtcgcc 120
tgccacggca aaaagggcga aggccgcgga accatgtttc cgccgctcta ccgctccgac 180
ttcatcatga aaaaaccgca ggtgctgctg cacagcatgg tcaaaggcat caacggtaca 240
atcaaagtca acggcaaaac ctacaacgga ttcatgcccg ccaactgccat cagcgatgcg 300
gacattgccg ccgtcgccac ttatatcatg aacgcctttg acaacggcgg cggaagcggt 360
accgaaaaag acgtaaaaac ggcaaaaaac aaaaaa 396

<210> 48
<211> 132
<212> PRT
<213> *Neisseria meningitidis*

<400> 48
Met Asn Thr Thr Arg Leu Pro Thr Ala Leu Val Leu Gly Cys Leu Cys
1 5 10 15

Ala Ala Ala Ser Ala Ala Asp Asn Ser Ile Met Thr Lys Gly Gln Lys
20 25 30

Val Tyr Glu Ser Asn Cys Val Ala Cys His Gly Lys Lys Gly Glu Gly
35 40 45

Arg Gly Thr Met Phe Pro Pro Leu Tyr Arg Ser Asp Phe Ile Met Lys
50 55 60

Lys Pro Gln Val Leu Leu His Ser Met Val Lys Gly Ile Asn Gly Thr
65 70 75 80

Ile Lys Val Asn Gly Lys Thr Tyr Asn Gly Phe Met Pro Ala Thr Ala
85 90 95

Ile Ser Asp Ala Asp Ile Ala Ala Val Ala Thr Tyr Ile Met Asn Ala
100 105 110

Phe Asp Asn Gly Gly Gly Ser Val Thr Glu Lys Asp Val Lys Gln Ala
115 120 125

Lys Asn Lys Lys
130

<210> 49
<211> 495
<212> DNA
<213> *Neisseria gonorrhoeae*

<400> 49
atgaacaaca gacattttgc cgtcatcgcc ttgggcagca accttgacaa ccccgacaaa 60
caaatacgcg gcgcattaga cgcgctctcg tccatcctg acatccggct tgaacagggt 120
tcctcactgt atatgaccgc acctgtcggg tacgacaatc agccccgatt catcaatgcc 180

```

gtctgcaccg tttccaccac cttggacggc attgccctgc ttgccgaact caaccgtatc 240
gaagccgatt tcggacgcga acgcagtttc cgcaatgcac cgcgcacatt ggatttggac 300
attatcgact ttgacggcat ctccagcgac gacccccgcc ttaccctgcc gcatccgcgc 360
gcgcacgaac gcagtttcgt catacgccct ttggcagaaa tcctccctga ttttattttg 420
ggaaaatacg gaaaggttgt cgaattgtca aaacggctgg gcaatcaagg catccgtctt 480
ttaccggaca ggtaa 495

```

<210> 50
 <211> 164
 <212> PRT
 <213> *Neisseria gonorrhoeae*

<400> 50
 Met Asn Asn Arg His Phe Ala Val Ile Ala Leu Gly Ser Asn Leu Asp
 1 5 10 15
 Asn Pro Ala Gln Gln Ile Arg Gly Ala Leu Asp Ala Leu Ser Ser His
 20 25 30
 Pro Asp Ile Arg Leu Glu Gln Val Ser Ser Leu Tyr Met Thr Ala Pro
 35 40 45
 Val Gly Tyr Asp Asn Gln Pro Asp Phe Ile Asn Ala Val Cys Thr Val
 50 55 60
 Ser Thr Thr Leu Asp Gly Ile Ala Leu Leu Ala Glu Leu Asn Arg Ile
 65 70 75 80
 Glu Ala Asp Phe Gly Arg Glu Arg Ser Phe Arg Asn Ala Pro Arg Thr
 85 90 95
 Leu Asp Leu Asp Ile Ile Asp Phe Asp Gly Ile Ser Ser Asp Asp Pro
 100 105 110
 Arg Leu Thr Leu Pro His Pro Arg Ala His Glu Arg Ser Phe Val Ile
 115 120 125
 Arg Pro Leu Ala Glu Ile Leu Pro Asp Phe Ile Leu Gly Lys Tyr Gly
 130 135 140
 Lys Val Val Glu Leu Ser Lys Arg Leu Gly Asn Gln Gly Ile Arg Leu
 145 150 155 160
 Leu Pro Asp Arg

<210> 51
 <211> 497
 <212> DNA
 <213> *Neisseria meningitidis*

<400> 51
 atgaacaaca gacatthttgc cgtcatcgcc ctgggcagta atcttgaaaa ccctgctcaa 60
 cagggtacgcg ccgcattgga cacgctgtcg tcccatcctg acatccgtct taaacaggct 120
 tcctcactgt atatgaccgc gcccgctcgt tacgacaatc agccccgatt tgtcaatgcc 180


```

gtctgcaccg tttccaccac tctggacggc attgccytgc ttgccgaact caaccgtatc 240
gaggctgatt tcggacgcga acgcagcttc cgcaacgcgc cgcgcacatt gkatttggac 300
attatcgact ttgacggcat ctccagcgac gacacsogac tcaccttgcc gcatccgcgc 360
gcgcacgaac gcagtttcgt catccgcoct ttggcagaaa tcctccctga ttttgtttta 420
ggaaaacacg gaaaggttgc cgaattgtca aaacggytgg gcaatcaagg tatccgtctt 480
ttaccggaca ggtaatt 497

```

```

<210> 52
<211> 164
<212> PRT
<213> Neisseria meningitidis

```

```

<220>
<221> UNSURE
<222> (98)
<223> Xaa is any amino acid

```

```

<400> 52
Met Asn Asn Arg His Phe Ala Val Ile Ala Leu Gly Ser Asn Leu Glu
  1             5             10             15

Asn Pro Ala Gln Gln Val Arg Ala Ala Leu Asp Thr Leu Ser Ser His
      20             25             30

Pro Asp Ile Arg Leu Lys Gln Ala Ser Ser Leu Tyr Met Thr Ala Pro
      35             40             45

Val Gly Tyr Asp Asn Gln Pro Asp Phe Val Asn Ala Val Cys Thr Val
      50             55             60

Ser Thr Thr Leu Asp Gly Ile Ala Leu Leu Ala Glu Leu Asn Arg Ile
      65             70             75             80

Glu Ala Asp Phe Gly Arg Glu Arg Ser Phe Arg Asn Ala Pro Arg Thr
      85             90             95

Leu Xaa Leu Asp Ile Ile Asp Phe Asp Gly Ile Ser Ser Asp Asp Thr
      100            105            110

Arg Leu Thr Leu Pro His Pro Arg Ala His Glu Arg Ser Phe Val Ile
      115            120            125

Arg Pro Leu Ala Glu Ile Leu Pro Asp Phe Val Leu Gly Lys His Gly
      130            135            140

Lys Val Ala Glu Leu Ser Lys Arg Leu Gly Asn Gln Gly Ile Arg Leu
      145            150            155            160

Leu Pro Asp Arg

```

```

<210> 53
<211> 495
<212> DNA
<213> Neisseria meningitidis

```

<400> 53
atgaacaaca gacatTTTtgc cgtcatcgcc ctggggcagta atcttgaaaa ccctgccc aa 60
caggtaacgc cgcattgga cagctgtcg tcccatcctg acatccgtct taaacaggct 120
tcctcactgt atatgaccgc gcccgtcggt tacgacaatc agcccgattt cgtcaatgcc 180
gtctgcaccg tttccaccac cttggacggc attgccctgc ttgccgaact caaccgtatc 240
gaagccgatt tcggacgcga acgcagcttc cgcaacgcgc cgcgcacatt ggatttggac 300
attatcgact ttgacggcat ctccagcgac gacccccgac tcaccctgcc gcatccgcgc 360
gcgcacgaac gcagtttctg catacgcctt ttggcagaaa tcttcctga ttttattttg 420
ggaaaacacg gaaaggttgc cgaattgtca aaacggctgg gcaatcaagg catccgtctt 480
ttaccggata agtaa 495

<210> 54
<211> 164
<212> PRT
<213> Neisseria meningitidis

<400> 54
Met Asn Asn Arg His Phe Ala Val Ile Ala Leu Gly Ser Asn Leu Glu
1 5 10 15
Asn Pro Ala Gln Gln Val Arg Ala Ala Leu Asp Thr Leu Ser Ser His
20 25 30
Pro Asp Ile Arg Leu Lys Gln Ala Ser Ser Leu Tyr Met Thr Ala Pro
35 40 45
Val Gly Tyr Asp Asn Gln Pro Asp Phe Val Asn Ala Val Cys Thr Val
50 55 60
Ser Thr Thr Leu Asp Gly Ile Ala Leu Leu Ala Glu Leu Asn Arg Ile
65 70 75 80
Glu Ala Asp Phe Gly Arg Glu Arg Ser Phe Arg Asn Ala Pro Arg Thr
85 90 95
Leu Asp Leu Asp Ile Ile Asp Phe Asp Gly Ile Ser Ser Asp Asp Pro
100 105 110
Arg Leu Thr Leu Pro His Pro Arg Ala His Glu Arg Ser Phe Val Ile
115 120 125
Arg Pro Leu Ala Glu Ile Leu Pro Asp Phe Ile Leu Gly Lys His Gly
130 135 140
Lys Val Ala Glu Leu Ser Lys Arg Leu Gly Asn Gln Gly Ile Arg Leu
145 150 155 160
Leu Pro Asp Lys

<210> 55
<211> 261
<212> DNA
<213> Neisseria gonorrhoeae

<400> 55
 atgccccgcg ctgccgtagc ctttgagcgt catcatcaca aaagcaaagc cgaacaaaat 60
 acccatcgcc ggcgcgacgc agagatagcc gaaggcttcg cggttggaaa tcagcacacg 120
 caggcgcgaa accagtccgt aatggcggta cagctgccgc tcgtcgcctt ttcggataaa 180
 gtggttgtcg cgttccaagc tgttgttcag gcggaaatac aggttttcgc tgatggcggc 240
 aaaacgtggc aaaagccata a 261

<210> 56
 <211> 86
 <212> PRT
 <213> *Neisseria gonorrhoeae*

<400> 56
 Met Pro Arg Ala Ala Val Ala Phe Glu Arg His His His Lys Ser Lys
 1 5 10 15
 Ala Glu Gln Asn Thr His Arg Arg Ala Asp Ala Glu Ile Ala Glu Gly
 20 25 30
 Phe Ala Val Gly Asn Gln His Thr Gln Ala Arg Asn Gln Ser Val Met
 35 40 45
 Ala Val Gln Leu Pro Leu Val Ala Phe Ser Asp Lys Val Val Val Ala
 50 55 60
 Phe Gln Ala Val Val Gln Ala Glu Ile Gln Val Phe Ala Asp Gly Gly
 65 70 75 80
 Lys Thr Trp Gln Lys Pro
 85

<210> 57
 <211> 261
 <212> DNA
 <213> *Neisseria meningitidis*

<400> 57
 atgccccgcg ctgctgtagc ctttgagcgt catcatcaca aaagcaaagc cgaacaaaat 60
 acccatcgcc gtgccgacgc agagatagcc gaaggcttcg cggttggaaa tcagcacacg 120
 caggcgcgca agcagtccgt aatggcggta cagctgccgc cggtcgcctt ttcggataaa 180
 gtggttgtcg cgttccaagc tgttgttcag gcggaaatac aggttttcgc tgatggcggc 240
 aaaacgtggc aaaagccata a 261

<210> 58
 <211> 86
 <212> PRT
 <213> *Neisseria meningitidis*

<400> 58
 Met Pro Arg Ala Ala Val Ala Phe Glu Arg His His His Lys Ser Lys
 1 5 10 15
 Ala Glu Gln Asn Thr His Arg Arg Ala Asp Ala Glu Ile Ala Glu Gly

[illegible]

<400> 61

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atgggttttc ctgttcgcaa gtttgatgcc gtgattgtcg gcggtggcgg tgcaggttta 60
cgtgcagccc tccaattatc caaatccggt ttgaattgtg ccgttttgtc taaagtgttc 120
ccgacccgct cgcataccgt agcggcgcag ggcggtatct ccgcctctct gggtaatgtg 180
caggaggacc gttgggactg gcacatgtac gataccgtga aagggttccga ctggctgggc 240
gaccaagatg cgattgagtt tatgtgtcgc gctgcgcctg aagcgggtgat tgagttggaa 300
cacatgggta tgccttttga ccgcgttgaa agcggcaaaa tttatcagcg tcctttcggc 360
ggacatactg ccgaacatgg taaacgtgcg gtagaacgtg catgtgcggt tgccgaccgt 420
accggtcatg cgatgttgca tactttgtac caacaaaacg tccgtgccaa tacacaattc 480
tttgtggaat ggacggcgca agatttgatt cgtgatgaaa acggcgatgt cgtcggcgta 540
accgccatgg aaatggaaac gggcgaagtt tataatttcc acgccaaaggc cgtgatgttt 600
gctaccggtg gcggcggtcg tatttatgct tcttctacca atgcttatat gaataccggt 660
gacggttttg gcatttgcgc ccgtgcgggc attccgttgg aagatatgga attctggcaa 720
ttccacccga ccggcgtggc ggggtgcgggc gtgttgatta ccgaaggcgt acgcggcgag 780
ggcgttattc tgttgaacgc cgacggcgaa cgctttatgg aacgctatgc gccgaccgta 840
aaagacttgg cttctcgcga cgtggtttca cgcgcgatgg cgatggaaat ctatgaaggt 900
cgcggctgtg gtaaaaaaaa agaccacgtc ttactgaaaa tgcaccatat cgggtgcagaa 960
aaaattatgg aaaaactgcc gggcatccgc gagatttcca ttcagtttgc cggtatcgat 1020
ccgattaaag acccgattcc ggttgtgccg actaccact atatgatggg cggcattccg 1080
accaattatc acggtgaagt tgttgttccg caaggcgacg agtacgaagt acctgtaaaa 1140
ggcctgtatg ccgcaggtga gtgcgcctgt gcttccgtac acggtgcgaa ccgtttgggt 1200
acgaactccc tgctggactt ggtggtgttc cgcccaaccc cccggtga 1248
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<210> 62

<211> 415

<212> PRT

<213> *Neisseria gonorrhoeae*

<400> 62

```
Met Gly Phe Pro Val Arg Lys Phe Asp Ala Val Ile Val Gly Gly Gly
  1             5             10             15
```

```
Gly Ala Gly Leu Arg Ala Ala Leu Gln Leu Ser Lys Ser Gly Leu Asn
      20             25             30
```

```
Cys Ala Val Leu Ser Lys Val Phe Pro Thr Arg Ser His Thr Val Ala
      35             40             45
```

```
Ala Gln Gly Gly Ile Ser Ala Ser Leu Gly Asn Val Gln Glu Asp Arg
      50             55             60
```

```
Trp Asp Trp His Met Tyr Asp Thr Val Lys Gly Ser Asp Trp Leu Gly
      65             70             75             80
```

```
Asp Gln Asp Ala Ile Glu Phe Met Cys Arg Ala Ala Pro Glu Ala Val
      85             90             95
```

```
Ile Glu Leu Glu His Met Gly Met Pro Phe Asp Arg Val Glu Ser Gly
     100             105             110
```

```
Lys Ile Tyr Gln Arg Pro Phe Gly Gly His Thr Ala Glu His Gly Lys
     115             120             125
```

```
Arg Ala Val Glu Arg Ala Cys Ala Val Ala Asp Arg Thr Gly His Ala
     130             135             140
```

Met Leu His Thr Leu Tyr Gln Gln Asn Val Arg Ala Asn Thr Gln Phe
 145 150 155 160
 Phe Val Glu Trp Thr Ala Gln Asp Leu Ile Arg Asp Glu Asn Gly Asp
 165 170 175
 Val Val Gly Val Thr Ala Met Glu Met Glu Thr Gly Glu Val Tyr Ile
 180 185 190
 Phe His Ala Lys Ala Val Met Phe Ala Thr Gly Gly Gly Gly Arg Ile
 195 200 205
 Tyr Ala Ser Ser Thr Asn Ala Tyr Met Asn Thr Gly Asp Gly Leu Gly
 210 215 220
 Ile Cys Ala Arg Ala Gly Ile Pro Leu Glu Asp Met Glu Phe Trp Gln
 225 230 235 240
 Phe His Pro Thr Gly Val Ala Gly Ala Gly Val Leu Ile Thr Glu Gly
 245 250 255
 Val Arg Gly Glu Gly Gly Ile Leu Leu Asn Ala Asp Gly Glu Arg Phe
 260 265 270
 Met Glu Arg Tyr Ala Pro Thr Val Lys Asp Leu Ala Ser Arg Asp Val
 275 280 285
 Val Ser Arg Ala Met Ala Met Glu Ile Tyr Glu Gly Arg Gly Cys Gly
 290 295 300
 Lys Asn Lys Asp His Val Leu Leu Lys Ile Asp His Ile Gly Ala Glu
 305 310 315 320
 Lys Ile Met Glu Lys Leu Pro Gly Ile Arg Glu Ile Ser Ile Gln Phe
 325 330 335
 Ala Gly Ile Asp Pro Ile Lys Asp Pro Ile Pro Val Val Pro Thr Thr
 340 345 350
 His Tyr Met Met Gly Gly Ile Pro Thr Asn Tyr His Gly Glu Val Val
 355 360 365
 Val Pro Gln Gly Asp Glu Tyr Glu Val Pro Val Lys Gly Leu Tyr Ala
 370 375 380
 Ala Gly Glu Cys Ala Cys Ala Ser Val His Gly Ala Asn Arg Leu Gly
 385 390 395 400
 Thr Asn Ser Leu Leu Asp Leu Val Val Phe Arg Pro Thr Pro Arg
 405 410 415

<210> 63
 <211> 696
 <212> DNA
 <213> Neisseria meningitidis

<220>
 <221> misc_feature
 <222> (1)
 <223> N is any nucleotide

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 <222> (100)
 <223> N is any nucleotide

<400> 63
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 tcgcataccg tagcggcgca gggcggtatt tccgcctctn tgggtaatgt gcaggaagac 120
 cggttgggact ggcacatgta cgataccgtg aaaggttccg actggttggg cgaccaagat 180
 gcgattgagt ttatgtgccg cgccgcgcct gaagccgtaa ttgagttgga acacatgggt 240
 atgccttttg accgtgtgga aagcggtaaa atttatcagc gtcctttcgg cggccatact 300
 gccgaacacg gtaaacgcgc ggtagaacgc gyctgtgcgg ttgccgaccg tacaggcat 360
 gcgatgctgc atactttgta ccaacaaaac gtccgtgcc aacgcaatt ctttgtggaa 420
 tggacggcac aagatttgat tcgtgatgaa aacggcgatg tcgtcggcgt aaccgccatg 480
 gaaatggaaa ccggcggaagt ttatatattc cacgcctaaag ctgtgatgtt tgctaccggc 540
 ggcggcggtc gtatttatgc gtcttctacc aatgcctata tgaataccgg cgatgggttg 600
 ggtatttggt cgcggtgcagg tatcccggtg gaagacatgg aattctggca attccagccg 660
 accggcgtgg cgggtgcggg cgtgttgatt accgaa 696

<210> 64
 <211> 234
 <212> PRT
 <213> Neisseria meningitidis

<220>
 <221> UNSURE
 <222> (1)
 <223> Xaa is any amino acid

<220>
 <221> UNSURE
 <222> (34)
 <223> Xaa is any amino acid

<220>
 <221> UNSURE
 <222> (112)
 <223> Xaa is any amino acid

<400> 64
 Xaa Gln Leu Ser Lys Ser Gly Leu Asn Cys Ala Val Leu Ser Lys Val
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 Phe Pro Thr Arg Ser His Thr Val Ala Ala Gln Gly Gly Ile Ser Ala
 20 25 30
 Ser Xaa Gly Asn Val Gln Glu Asp Arg Trp Asp Trp His Met Tyr Asp
 35 40 45
 Thr Val Lys Gly Ser Asp Trp Leu Gly Asp Gln Asp Ala Ile Glu Phe

50	55	60
Met Cys Arg Ala Ala Pro Glu Ala Val Ile Glu Leu Glu His Met Gly		
65	70	75 80
Met Pro Phe Asp Arg Val Glu Ser Gly Lys Ile Tyr Gln Arg Pro Phe		
	85	90 95
Cys Ala Val Ala Asp Arg Thr Gly His Ala Met Leu His Thr Leu Tyr		
	100	105 110
Gln Gln Asn Val Arg Ala Asn Thr Gln Phe Phe Val Glu Trp Thr Ala		
	115	120 125
Gln Asp Leu Ile Arg Asp Glu Asn Gly Asp Val Val Gly Val Thr Ala		
	130	135 140
Met Glu Met Glu Thr Gly Glu Val Tyr Ile Phe His Ala Lys Ala Val		
145	150	155 160
Met Phe Ala Thr Gly Gly Gly Gly Arg Ile Tyr Ala Ser Ser Thr Asn		
	165	170 175
Gly Ile Pro Leu Glu Asp Met Glu Phe Trp Gln Phe Gln Pro Thr Gly		
	180	185 190
Val Ala Gly Ala Gly Val Leu Ile Thr Glu		
	195	200

<210> 65
 <211> 1764
 <212> DNA
 <213> Neisseria meningitidis

<220>
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 <222> (67)
 <223> N is any nucleotide

<220>
 <221> misc_feature
 <222> (408)
 <223> N is any nucleotide

<400> 65
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 ccgaccggtt cgcataccgt agcggcgag ggcggtattt ccgcctctct gggtaatgtg 180
 caggaagacc gttgggactg gcacatgtac gataccgtga aaggttccga ctggttgggc 240
 gaccaagatg cgattgagtt tatgtgccgc gccgcgcctg aagccgtaat tgagttggaa 300
 cacatgggta tgccttttga ccgtgtggaa agcggtaaaa tttatcagcg tcctttcggc 360
 ggccatactg ccgaacacgg taaacgcgcg gtagaacgcg cctgtgcngt tgccgaccgt 420
 acaggtcatg cgatgctgca tactttgtac caacaaaatg tccgtgccaa tacgcaattc 480
 tttgtggaat ggacggcaca agatttgatt cgtgatgaaa acggcgatgt cgtcggcgta 540
 accgccatgg aaatggaaac cggcgaagtt tatattttcc acgctaaagc tgtgatgttt 600

gctaccggcg gcggcgggcg tatttatgcg tcttctacca atgcctatat gaataccggc 660
gatggtttgg gtatttgtgc gcgtgcaggt atcccgttgg aagacatgga attctggcaa 720
ttccaccgca ccggcggtggc aggtgcgggc gtgttgatta ccgaaggcgt acgcggcgag 780
ggcgggtattc tgttgaatgc cgacggcgaa cgctttatgg aacgctatgc gccgaccgta 840
aaagacttgg cttctcgcgga cgttgtttcc cgcgcgatgg cgatggaaat ctacgaaggt 900
cgcggtctgcg gtaaaaacaa agaccatgtc ttactgaaaa tcgaccatat cggcgcgagaa 960
aaaattatgg aaaaactgcc gggcatccgc gagatttcca ttcagttcgc cgggtatcgat 1020
ccgattaaag acccgattcc cgttgtgccg actaccact atatgatggg cgggtattccg 1080
accaactacc atggcgaggt tgtcgttcct caaggcgacg aatacgaagt gcctgtaaaa 1140
ggtctgtatg cggcaggtga gtgcgcctgt gcttccgtac acggtgcgaa ccgcttgagg 1200
acgaactccc tgctggactt agtggatttc ggtaaagctg ccggcgacag catgattaaa 1260
ttcatcaaag agcaaagcga ctggaaacct ttgcctgcta atgcggcgga actgaccgcg 1320
caacgtatcg agcgtttgga caatcaaact gatggtgaaa acgttgatgc attgcgcgcg 1380
gaactgcaac gtcctgtaca attgcacgcc ggcggtgtcc gtactgatga gattctgagc 1440
aaaggcgttc gagaagtcac ggcgattgcc gagcgtgtga aacgtaccga aatcaaagac 1500
aagagcaaaag tgtggaatac cgcgcgatc gaggctttgg aattggataa cctaattgaa 1560
gtggcgaaaag cgactttggt gtctgccgaa gcacgtaaaag aatcacgcgg tgcgcacgct 1620
tcagacgacc atcctgagcg cgatgatgaa aactggatga aacatacgct gtaccattca 1680

gatgccaata ccttgtccta caaacgggtg cacaccaagc ctttgagcgt ggaatacatc 1740
aaaccggcca agcgcgttta ttga 1764

<210> 66
<211> 587
<212> PRT
<213> *Neisseria meningitidis*

<220>
<221> UNSURE
<222> (23)
<223> Xaa is any amino acid

<400> 66
Met Gly Phe Pro Val Arg Lys Phe Asp Ala Val Ile Val Gly Gly Gly
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Gly Ala Gly Leu Arg Ala Xaa Leu Gln Leu Ser Lys Ser Gly Leu Asn
20 25 30
Cys Ala Val Leu Ser Lys Val Phe Pro Thr Arg Ser His Thr Val Ala
35 40 45
Ala Gln Gly Gly Ile Ser Ala Ser Leu Gly Asn Val Gln Glu Asp Arg
50 55 60
Trp Asp Trp His Met Tyr Asp Thr Val Lys Gly Ser Asp Trp Leu Gly
65 70 75 80
Asp Gln Asp Ala Ile Glu Phe Met Cys Arg Ala Ala Pro Glu Ala Val
85 90 95
Ile Glu Leu Glu His Met Gly Met Pro Phe Asp Arg Val Glu Ser Gly
100 105 110
Lys Ile Tyr Gln Arg Pro Phe Gly Gly His Thr Ala Glu His Gly Lys
115 120 125

Arg Ala Val Glu Arg Ala Cys Ala Val Ala Asp Arg Thr Gly His Ala
 130 135 140
 Met Leu His Thr Leu Tyr Gln Gln Asn Val Arg Ala Asn Thr Gln Phe
 145 150 155 160
 Phe Val Glu Trp Thr Ala Gln Asp Leu Ile Arg Asp Glu Asn Gly Asp
 165 170 175
 Val Val Gly Val Thr Ala Met Glu Met Glu Thr Gly Glu Val Tyr Ile
 180 185 190
 Phe His Ala Lys Ala Val Met Phe Ala Thr Gly Gly Gly Gly Arg Ile
 195 200 205
 Tyr Ala Ser Ser Thr Asn Ala Tyr Met Asn Thr Gly Asp Gly Leu Gly
 210 215 220
 Ile Cys Ala Arg Ala Gly Ile Pro Leu Glu Asp Met Glu Phe Trp Gln
 225 230 235 240
 Phe His Pro Thr Gly Val Ala Gly Ala Gly Val Leu Ile Thr Glu Gly
 245 250 255
 Val Arg Gly Glu Gly Gly Ile Leu Leu Asn Ala Asp Gly Glu Arg Phe
 260 265 270
 Met Glu Arg Tyr Ala Pro Thr Val Lys Asp Leu Ala Ser Arg Asp Val
 275 280 285
 Val Ser Arg Ala Met Ala Met Glu Ile Tyr Glu Gly Arg Gly Cys Gly
 290 295 300
 Lys Asn Lys Asp His Val Leu Leu Lys Ile Asp His Ile Gly Ala Glu
 305 310 315 320
 Lys Ile Met Glu Lys Leu Pro Gly Ile Arg Glu Ile Ser Ile Gln Phe
 325 330 335
 Ala Gly Ile Asp Pro Ile Lys Asp Pro Ile Pro Val Val Pro Thr Thr
 340 345 350
 His Tyr Met Met Gly Gly Ile Pro Thr Asn Tyr His Gly Glu Val Val
 355 360 365
 Val Pro Gln Gly Asp Glu Tyr Glu Val Pro Val Lys Gly Leu Tyr Ala
 370 375 380
 Ala Gly Glu Cys Ala Cys Ala Ser Val His Gly Ala Asn Arg Leu Gly
 385 390 395 400
 Thr Asn Ser Leu Leu Asp Leu Val Val Phe Gly Lys Ala Ala Gly Asp
 405 410 415
 Ser Met Ile Lys Phe Ile Lys Glu Gln Ser Asp Trp Lys Pro Leu Pro
 420 425 430

Ala Asn Ala Gly Glu Leu Thr Arg Gln Arg Ile Glu Arg Leu Asp Asn
435 440 445

Gln Thr Asp Gly Glu Asn Val Asp Ala Leu Arg Arg Glu Leu Gln Arg
450 455 460

Ser Val Gln Leu His Ala Gly Val Phe Arg Thr Asp Glu Ile Leu Ser
465 470 475 480

Lys Gly Val Arg Glu Val Met Ala Ile Ala Glu Arg Val Lys Arg Thr
485 490 495

Glu Ile Lys Asp Lys Ser Lys Val Trp Asn Thr Ala Arg Ile Glu Ala
500 505 510

Leu Glu Leu Asp Asn Leu Ile Glu Val Ala Lys Ala Thr Leu Val Ser
515 520 525

Ala Glu Ala Arg Lys Glu Ser Arg Gly Ala His Ala Ser Asp Asp His
530 535 540

Pro Glu Arg Asp Asp Glu Asn Trp Met Lys His Thr Leu Tyr His Ser
545 550 555 560

Asp Ala Asn Thr Leu Ser Tyr Lys Pro Val His Thr Lys Pro Leu Ser
565 570 575

Val Glu Tyr Ile Lys Pro Ala Lys Arg Val Tyr
580 585

<210> 67
<211> 1248
<212> DNA
<213> Neisseria gonorrhoeae

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ccgacccgct cgcataccgt agcggcgcag ggcggtatct ccgcctctct gggtaatgtg 180
caggaggacc gttgggactg gcacatgtac gataccgtga aaggttccga ctggctgggc 240
gaccaagatg cgattgagtt tatgtgtcgc gctgcgcctg aagcggatgat tgagttggaa 300
cacatgggta tgccttttga ccgcgttgaa agcggcaaaa tttatcagcg tcctttcggc 360
ggacatactg ccgaacatgg taaacgtgcg gtagaacgtg catgtgcggt tgccgaccgt 420
accggtcatg cgatgttgca tactttgtac caacaaaacg tccgtgccaa tacacaattc 480
tttgtggaat ggacggcgca agatttgatt cgtgatgaaa acggcgatgt cgtcggcgta 540
accgccatgg aaatggaaac gggcgaagtt tatattttcc acgccaaggc cgtgatgttt 600
gctaccggtg gcggcggtcg tatttatgct tcttctacca atgcttatat gaataccggt 660
gacggtttgg gcatgtgcgc ccgtgcgggc attccgttgg aagatatgga attctggcaa 720
ttccaccoga ccggcgtggc ggggtgcggc gtgttgatta ccgaaggcgt acgcggcgag 780
ggcggtatct tgttgaacgc cgacggcgaa cgctttatgg aacgctatgc gccgaccgta 840
aaagacttgg cttctcgcga cgtggtttca cgcgcatgag cgatggaaat ctatgaaggt 900
cgcggtgtg gtaaaaacaa agaccacgtc ttactgaaaa tcgaccatat cgggtgcagaa 960
aaaattatgg aaaaactgcc gggcatccgc gagatttcca ttcagtttgc cggtatcgat 1020
ccgattaaag acccgattcc ggttgtgcgc actaccact atatgatggg cggcattccg 1080
accaattatc acggtgaagt tgttgttccg caaggcgcag agtacgaagt acctgtaaaa 1140

ggcctgtatg ccgcaggtga gtgcgcctgt gcttccgtac acggtgcgaa ccgtttgggt 1200
 acgaactccc tgctggactt ggtggtgttc cgcccaaccc cccggtga 1248

<210> 68
 <211> 415
 <212> PRT
 <213> Neisseria gonorrhoeae

<400> 68
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 20 25 30
 Cys Ala Val Leu Ser Lys Val Phe Pro Thr Arg Ser His Thr Val Ala
 35 40 45
 Ala Gln Gly Gly Ile Ser Ala Ser Leu Gly Asn Val Gln Glu Asp Arg
 50 55 60
 Trp Asp Trp His Met Tyr Asp Thr Val Lys Gly Ser Asp Trp Leu Gly
 65 70 75 80
 Asp Gln Asp Ala Ile Glu Phe Met Cys Arg Ala Ala Pro Glu Ala Val
 85 90 95
 Ile Glu Leu Glu His Met Gly Met Pro Phe Asp Arg Val Glu Ser Gly
 100 105 110
 Lys Ile Tyr Gln Arg Pro Phe Gly Gly His Thr Ala Glu His Gly Lys
 115 120 125
 Arg Ala Val Glu Arg Ala Cys Ala Val Ala Asp Arg Thr Gly His Ala
 130 135 140
 Met Leu His Thr Leu Tyr Gln Gln Asn Val Arg Ala Asn Thr Gln Phe
 145 150 155 160
 Phe Val Glu Trp Thr Ala Gln Asp Leu Ile Arg Asp Glu Asn Gly Asp
 165 170 175
 Val Val Gly Val Thr Ala Met Glu Met Glu Thr Gly Glu Val Tyr Ile
 180 185 190
 Phe His Ala Lys Ala Val Met Phe Ala Thr Gly Gly Gly Gly Arg Ile
 195 200 205
 Tyr Ala Ser Ser Thr Asn Ala Tyr Met Asn Thr Gly Asp Gly Leu Gly
 210 215 220
 Ile Cys Ala Arg Ala Gly Ile Pro Leu Glu Asp Met Glu Phe Trp Gln
 225 230 235 240
 Phe His Pro Thr Gly Val Ala Gly Ala Gly Val Leu Ile Thr Glu Gly
 245 250 255

Val Arg Gly Glu Gly Gly Ile Leu Leu Asn Ala Asp Gly Glu Arg Phe
 260 265 270
 Met Glu Arg Tyr Ala Pro Thr Val Lys Asp Leu Ala Ser Arg Asp Val
 275 280 285
 Val Ser Arg Ala Met Ala Met Glu Ile Tyr Glu Gly Arg Gly Cys Gly
 290 295 300
 Lys Asn Lys Asp His Val Leu Leu Lys Ile Asp His Ile Gly Ala Glu
 305 310 315 320
 Lys Ile Met Glu Lys Leu Pro Gly Ile Arg Glu Ile Ser Ile Gln Phe
 325 330 335
 Ala Gly Ile Asp Pro Ile Lys Asp Pro Ile Pro Val Val Pro Thr Thr
 340 345 350
 His Tyr Met Met Gly Gly Ile Pro Thr Asn Tyr His Gly Glu Val Val
 355 360 365
 Val Pro Gln Gly Asp Glu Tyr Glu Val Pro Val Lys Gly Leu Tyr Ala
 370 375 380
 Ala Gly Glu Cys Ala Cys Ala Ser Val His Gly Ala Asn Arg Leu Gly
 385 390 395 400
 Thr Asn Ser Leu Leu Asp Leu Val Val Phe Arg Pro Thr Pro Arg
 405 410 415

<210> 69
 <211> 1767
 <212> DNA
 <213> Neisseria meningitidis

<400> 69
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 ccgaccggtt cgcataccgt agcggcgag ggcggtattt ccgcctctct gggtaatgtg 180
 caggaagacc gttgggactg gcacatgtac gataccgtga aaggttccga ctggttgggc 240
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 ggccatactg ccgaacacgg taaacgcgcg gtagaacgcg cctgtgcggt tgccgaccgt 420
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 ggcggtattc tgttgaatgc cgacggcgaa cgctttatgg aacgctatgc gccgaccgta 840
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 cgcggtgcg gtaaaaaaaa agaccatgtc ttactgaaaa tcgaccatat cggcgagaa 960
 aaaattatgg aaaaactgcc gggcatccgc gagatttcca ttcagttcgc cggatcgcg 1020
 ccgattaaag acccgattcc cgttgtgccg actaccact atatgatggg cggcattccg 1080
 accaattacc acggcgaagt tgtcgttccg caaggtgaag attacgaagt gcctgtaaaa 1140

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ggtctgtatg cggcaggtga gtgcgcttgt gcttccgtac acggtgcgaa ccgcttgggt 1200
accaactccc tgttggaactt ggtggtattc ggtaaagctg ccggcgacag catgattaaa 1260
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tcagacgacc atcctgagcg cgatgatgaa aactggatga aacatacgct gtaccattca 1680
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aaaccggcca agcgcggtta ttgatga 1767

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<210> 70
 <211> 587
 <212> PRT
 <213> *Neisseria meningitidis*

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 20             25             30

Cys Ala Val Leu Ser Lys Val Phe Pro Thr Arg Ser His Thr Val Ala
 35             40             45

Ala Gln Gly Gly Ile Ser Ala Ser Leu Gly Asn Val Gln Glu Asp Arg
 50             55             60

Trp Asp Trp His Met Tyr Asp Thr Val Lys Gly Ser Asp Trp Leu Gly
 65             70             75             80

Asp Gln Asp Ala Ile Glu Phe Met Cys Arg Ala Ala Pro Glu Ala Val
 85             90             95

Ile Glu Leu Glu His Met Gly Met Pro Phe Asp Arg Val Glu Ser Gly
 100            105            110

Lys Ile Tyr Gln Arg Pro Phe Gly Gly His Thr Ala Glu His Gly Lys
 115            120            125

Arg Ala Val Glu Arg Ala Cys Ala Val Ala Asp Arg Thr Gly His Ala
 130            135            140

Met Leu His Thr Leu Tyr Gln Gln Asn Val Arg Ala Asn Thr Gln Phe
 145            150            155            160

Phe Val Glu Trp Thr Ala Gln Asp Leu Ile Arg Asp Glu Asn Gly Asp
 165            170            175

Val Val Gly Val Thr Ala Met Glu Met Glu Thr Gly Glu Val Tyr Ile
 180            185            190

Phe His Ala Lys Ala Val Met Phe Ala Thr Gly Gly Gly Arg Ile

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195					200					205					
Tyr	Ala	Ser	Ser	Thr	Asn	Ala	Tyr	Met	Asn	Thr	Gly	Asp	Gly	Leu	Gly
210					215						220				
Ile	Cys	Ala	Arg	Ala	Gly	Ile	Pro	Leu	Glu	Asp	Met	Glu	Phe	Trp	Gln
225					230					235					240
Phe	His	Pro	Thr	Gly	Val	Ala	Gly	Ala	Gly	Val	Leu	Ile	Thr	Glu	Gly
				245					250					255	
Val	Arg	Gly	Glu	Gly	Gly	Ile	Leu	Leu	Asn	Ala	Asp	Gly	Glu	Arg	Phe
			260					265					270		
Met	Glu	Arg	Tyr	Ala	Pro	Thr	Val	Lys	Asp	Leu	Ala	Ser	Arg	Asp	Val
			275				280					285			
Val	Ser	Arg	Ala	Met	Ala	Met	Glu	Ile	Tyr	Glu	Gly	Arg	Gly	Cys	Gly
290					295					300					
Lys	Asn	Lys	Asp	His	Val	Leu	Leu	Lys	Ile	Asp	His	Ile	Gly	Ala	Glu
305					310					315					320
Lys	Ile	Met	Glu	Lys	Leu	Pro	Gly	Ile	Arg	Glu	Ile	Ser	Ile	Gln	Phe
				325					330					335	
Ala	Gly	Ile	Asp	Pro	Ile	Lys	Asp	Pro	Ile	Pro	Val	Val	Pro	Thr	Thr
			340					345					350		
His	Tyr	Met	Met	Gly	Gly	Ile	Pro	Thr	Asn	Tyr	His	Gly	Glu	Val	Val
			355				360					365			
Val	Pro	Gln	Gly	Glu	Asp	Tyr	Glu	Val	Pro	Val	Lys	Gly	Leu	Tyr	Ala
370					375					380					
Ala	Gly	Glu	Cys	Ala	Cys	Ala	Ser	Val	His	Gly	Ala	Asn	Arg	Leu	Gly
385					390					395					400
Thr	Asn	Ser	Leu	Leu	Asp	Leu	Val	Val	Phe	Gly	Lys	Ala	Ala	Gly	Asp
			405						410					415	
Ser	Met	Ile	Lys	Phe	Ile	Lys	Glu	Gln	Ser	Asp	Trp	Lys	Pro	Leu	Pro
			420					425					430		
Ala	Asn	Ala	Gly	Glu	Leu	Thr	Arg	Gln	Arg	Ile	Glu	Arg	Leu	Asp	Asn
			435				440					445			
Gln	Thr	Asp	Gly	Glu	Asn	Val	Asp	Ala	Leu	Arg	Arg	Glu	Leu	Gln	Arg
450					455					460					
Ser	Val	Gln	Leu	His	Ala	Gly	Val	Phe	Arg	Thr	Asp	Glu	Ile	Leu	Ser
465					470					475					480
Lys	Gly	Val	Arg	Glu	Val	Met	Ala	Ile	Ala	Glu	Arg	Val	Lys	Arg	Thr
			485						490					495	
Glu	Ile	Lys	Asp	Lys	Ser	Lys	Val	Trp	Asn	Thr	Ala	Arg	Ile	Glu	Ala